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RF/RMRS 96 0061

REV 0 Final Site Specific H&S Plan for the Source Removal at
the Mound Site

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ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RELEASE

MOUND SITE SOURCE REMOVAL

REPAIR DOMESTIC WATER LINE AND CULVERT

Activity Hazard Analysis

4-15-97

| Activity | Hazard | Preventative Measures |
|----------------------------------|------------------------------|---|
| All site activities | General work hazards | All personnel will wear steel toed shoes, safety glasses with side shields, hard hats, reflective vests, and hearing protection as applicable in the support zone |
| | Heat stress | Heat stress monitoring will be conducted in regards to work load and PPE worn |
| | Cold stress | Cold stress monitoring will be conducted Proper clothing will be available to all personnel and administrative controls will be adhered to |
| | Noise | Noise monitoring will be conducted Where necessary personnel will wear hearing protection In addition all personnel will participate in the RFETS Hearing Conservation Program if necessary |
| Traversing the site | Slip trips falls | Care will be taken when traversing the site especially when wearing PPE and carrying equipment All trip hazards will be immediately removed or marked when identified |
| Lifting equipment and materials | Back injury | Proper lifting techniques will be used and heavy equipment, where feasible will be utilized to move heavy loads |
| Handling equipment and materials | Pinch points and sharp edges | Care will be taken when pinch points and sharp edges exist and heavy duty leather work gloves will be worn |

| Activity | Hazard | Preventative Measures |
|-------------------|--|--|
| Using hand tools | Hand tools in unsafe operating condition | Hand tools will be inspected by the user prior to each use |
| | Improper use of hand tools | Hand tools will be utilized for their intended use and operated in accordance with HSP-12 10 Guards will be in place and no modifications will be made. |
| | Electrical shock | Portable power tools will be plugged into a GFCI protected outlet and will be UL listed and double insulated Cords will be inspected by the user and protected from unnecessary damage. Any tool whose cord shows signs of damage or deterioration will be immediately removed from service The sawsall will be operated in accordance with the manufacturers specifications |
| Use of generators | Electrical shock | Extension cords will be intended for outdoor use, inspected by the user, and protected from unnecessary damage Any extension cords which show signs of damage or deterioration will be immediately removed from service |
| | Electrical shock | Cords will be plugged into a GFCI protected outlet and the generator will be properly grounded The GFCI will be tested by the user daily prior to the beginning of each shift |
| | Fire | At a minimum, a 10 lb ABC fire extinguisher will be located in the work area and next to the generator All refueling will be conducted at the beginning of the shift when the generators are cool |
| | Use of gasoline | Follow recommendations on MSDS (see Appendix C) |

| Activity | Hazard | Preventative Measures |
|---|---|---|
| Backhoe operation | Backhoe in poor operating condition | The backhoe will be inspected prior to entering the Mound site. The operator will inspect and document the backhoe prior to the beginning of each shift. |
| | Improper operation of the Backhoe | Operators will be properly trained in the use and limitations of the backhoe. |
| | Ground personnel being struck with backhoe or falling loads | Ground personnel will wear orange vests, stay at least 20 feet away from the backhoe, and maintain line of sight with the operator. |
| | Other equipment being struck with backhoe | Backhoe operations will be conducted in a deliberate safe manner. A spotter will be required when backing the backhoe. |
| Use of Level B respiratory protection (if applicable) | Physical fatigue | Medical approval will be required for personnel. |
| | Improper face to facepiece seal | Respirator specific fit test approval will be required for personnel. |
| | Improper inspection or use of respirator | Personnel will be trained in the inspection, use and limitations of the specific respirator worn. |
| | Unsecured airline bottles on backhoe | Airline bottles will be inspected by the user prior to and during each shift. |
| Working near or with potentially contaminated soil | Skin exposure to volatile organic compounds | Personnel in the EZ/SCA will wear Anti-C PPE and limit contact with contaminated soil. |
| | Inhalation of volatile organic compounds | Personnel in the EZ/SCA will wear respiratory protection based on real time work area VOC monitoring. CRZ/RBA and support zone work controls will be based on perimeter real-time VOC monitoring. |
| | Skin exposure to radionuclides in soil | Personnel in the EZ/SCA will wear Anti-C PPE and limit contact with contaminated soil. |

| Activity | Hazard | Preventative Measures |
|--|---|--|
| Working near or with potentially contaminated soil | Inhalation of radionuclides | EZ/SCA, CRZ/RBA, and support zone work controls will be based on perimeter low and high volume radiological air monitoring. |
| Cutting the galvanized culvert with sawsall | Potential inhalation of cadmium or zinc particulate | Full facepiece, air-purifying respirators will be worn |
| Working around open excavation | Sloughing of trench walls | The trench will be inspected prior to and during each shift. |
| | Equipment falling into trench | All equipment and soil from the excavation will be kept a minimum of two feet away from the edge of the trench |
| Spraying water for dust control and pumping decontamination or incidental water into the holding tanks or into tanker trucks | Pump malfunction or hose rupture | Pumps and hoses will be inspected by the user prior to use. The hoses will be protected from unnecessary damage. The discharge end of the incidental water hose will be submerged in the holding tank. Tankers will be filled in accordance with their safety guidelines |
| Entering the trench | Cave in of trench walls | The trench will be sloped at a 1 5 1 angle to facilitate entry and egress. A Kaiser-Hill Excavation Specialist will inspect the trench daily prior to personnel entering. |
| Removing old culvert from the excavation and placing new culvert into the excavation | Personnel being crushed by culvert sections | Culvert pieces will be removed from and placed into the excavation using approved straps or chains and a backhoe. The backhoe will not hoist the culvert sections, rather they will be dragged out of and slid into the excavation. |
| | Failure of chains or straps | Personnel will stay away from the area when the sections are being removed and will not position themselves downhill of the section when it is being placed into the excavation |
| Sanitizing the water line | Use of Clorox® | Follow attached MSDS |

| Activity | Hazard | Preventative Measures |
|-------------------|-----------|---|
| Soldering the cap | Explosion | Monitoring will be performed for combustible gases The torch will be operated in accordance with HSP-12 11 |
| | Fire | A Burn Permit will be obtained from RFFD A 10 lb fire extinguisher will be located in the work area and a fire watch will be posted |

Approved

Signature

Date

RMRS Project Manager-Wayne Sproles

Wayne Sproles 1 4-15-97

RMRS H&S Supervisor-Peggy Schreckengast

Peggy Schreckengast 1 4-15-97

RMRS Radiological Coordinator-Jerry Anderson

Jerry Anderson 1 4-15-97

SSOC Radiological Engineer-Scott Newsom

Scott Newsom 4/15/97



The Clorox Company
7200 Johnson Drive
Pleasanton, California 94566
Tel. (415) 847-6100

REC'D OCT 12 1987

Material Safety Data Sheet

| | |
|---------------------|---|
| CLOXOX-BMS | |
| HEALTH | 2 |
| FLAMMABILITY | 0 |
| REACTIVITY | 1 |
| Physical Properties | 8 |

| | | |
|---|---|---|
| I Chemical Identification | | |
| NAME: REGULAR CLOXOX BLEACH | | CAS No. N/A |
| DESCRIPTION: CLEAR, LIGHT YELLOW LIQUID WITH CHLORINE ODOR | | UNCLAS. No. N/A |
| Other Designations | | Manufacturer |
| EPA Reg No 5813-1 Sodium hypochlorite solution Liquid chlorine bleach Clorox Liquid Bleach | The Clorox Company 1221 Broadway Oakland, CA. 94612 | Emergency Procedure Notify your Supervisor Call your local poison control center or Rocky Mountain Poison Center (303) 576-3014 |
| II Health Hazard Data | | |
| <p>*Causes severe but temporary eye injury. May irritate skin. May cause nausea and vomiting if ingested. Exposure to vapor or mist may irritate nose, throat and lungs. The following medical conditions may be aggravated by exposure to high concentrations of vapor or mist: heart conditions or chronic respiratory problems such as asthma, chronic bronchitis or obstructive lung disease. Under normal consumer use conditions the likelihood of any adverse health effects are low. FIRST AID: EYE CONTACT: Immediately flush eyes with plenty of water. If irritation persists, see a doctor. SKIN CONTACT: Remove contaminated clothing. Wash area with water. INGESTION: Drink a glassful of water and call a physician. INHALATION: If breathing problems develop remove to fresh air.</p> | | |
| III Hazardous Ingredients | | |
| <u>Ingredients</u> | <u>Concentration</u> | <u>Worker Exposure Limit</u> |
| Sodium hypochlorite CAS# 7681-92-9 | 5.25% | not established |
| None of the ingredients in this product are on the IARC NTP or OSHA carcinogen list. Occasional clinical reports suggest a low potential for sensitization upon exaggerated exposure to sodium hypochlorite if skin damage (eg. irritation) occurs during exposure. Routine clinical tests conducted on intact skin with Clorox Liquid Bleach found no sensitization in the test subjects. | | |
| IV Special Protection Information | | |
| <p><u>Hygienic Practices</u> Wear safety glasses. With repeated or prolonged use, wear gloves.</p> <p><u>Engineering Controls</u> Use general ventilation to minimize exposure to vapor or mist.</p> <p><u>Work Practices</u> Avoid eye and skin contact and inhalation of vapor or mist.</p> | | |
| V Special Precautions | | |
| Keep out of reach of children. Do not get in eyes or on skin. Wash thoroughly with soap and water after handling. Do not mix with other household chemicals such as toilet bowl cleaners, rust removers, vinegar, acids or ammonia containing products. Store in a cool, dry place. Do not reuse empty container. Rinse container and put in trash container. | | |
| VI Spill or Leak Procedures | | |
| Small quantities of less than 5 gallons may be flushed down drain. For larger quantities wipe up with an absorbent material or mop and dispose of in accordance with local state and federal regulations. Dilute with water to minimize oxidizing effect on spilled surface. | | |
| VII Reactivity Data | | |
| Stable under normal use and storage conditions. Strong oxidizing agent. Reacts with other household chemicals such as toilet bowl cleaners, rust removers, vinegar, acids or ammonia containing products to produce hazardous gases, such as chlorine and other chlorinated species. Prolonged contact with metal may cause pitting or discoloration. | | |
| VIII Fire and Explosion Data | | |
| Not flammable or explosive. In a fire, cool containers to prevent rupture and release of sodium chlorate. | | |
| IX Physical Data | | |
| Boiling point: 212°F/100°C (decomposes) Specific Gravity (H ₂ O=1): 1.065 Solubility in water: complete pH: 11.4 | | |

| | | ELEMENTS (ICP) | | | |
|--|-----------------------------------|--|-------------|-----------|-----------|
| M W Table 1 | | METHOD | 7300 | | |
| | | ISSUED | 2/15/84 | | |
| OSHA/NIOSH/ACGIH Table 1 | | PROPERTIES Table 1 | | | |
| ELEMENTS | aluminum | cobalt | manganese | silver | tungsten |
| | arsenic | copper | molybdenum | sodium | vanadium |
| | beryllium | iron | nickel | tellurium | yttrium |
| | cadmium | lead | phosphorus | thallium | zinc |
| | calcium | lithium | platinum | tin | zirconium |
| | chromium | magnesium | selenium | titanium | |
| SYNONYMS vary depending upon the compound | | | | | |
| SAMPLING | | | MEASUREMENT | | |
| SAMPLER | FILTER | TECHNIQUE INDUCTIVELY COUPLED ARGON PLASMA | | | |
| | (0.8-µm cellulose ester membrane) | ATOMIC EMISSION SPECTROSCOPY | | | |
| FLOW RATE | 1 to 4 L/min | ANALYTE elements above | | | |
| VOL-MIN | Table 1 | ASHING REAGENTS conc HNO ₃ , 4 mL, | | | |
| -MAX | Table 1 | and conc HClO ₄ , 1 mL | | | |
| SHIPMENT | routine | CONDITIONS room temperature, 30 min, | | | |
| | | 150 °C to near dryness | | | |
| SAMPLE STABILITY | stable | FINAL SOLUTION 4% HNO ₃ , 1% HClO ₄ , 10 mL | | | |
| BLANKS | 2 to 10 field blanks per set | WAVELENGTH depends upon element, Table 2 | | | |
| ACCURACY | | BACKGROUND CORRECTION spectral wavelength shift | | | |
| PRECISION (s _p) Table 1 | | CALIBRATION elements in 4% HNO ₃ , 1% HClO ₄ | | | |
| BIAS none identified | | RANGE 2.5 to 1000 µg per sample [1] | | | |
| OVERALL PRECISION (s _p) not evaluated | | ESTIMATED LOD 1 µg per sample [1] | | | |
| | | PRECISION (s _p) Table 2 | | | |
| APPLICABILITY The working range of this method is 0.005 to 2.0 mg/m ³ for each element in a 500-L air sample. This is simultaneous elemental analysis, not compound specific. Verify that the types of compounds in the samples are soluble with this ashing procedure. | | | | | |
| INTERFERENCES Spectral interferences are the primary interferences encountered in ICP-AES analysis. These are minimized by judicious wavelength selection, interelement correction factors and background correction [1,2]. | | | | | |
| OTHER METHODS This method replaces P&CAM 351 [2] for trace elements. Atomic absorption spectroscopy (e.g., Methods 700X) is an alternate analytical technique for many of these elements. | | | | | |

REAGENTS

- 1 Nitric acid, conc
- 2 Perchloric acid, conc *
- 3 Ashing acid 4:1 (v/v) $\text{HNO}_3\text{:HClO}_4$
Mix 4 volumes conc HNO_3 with
1 volume conc HClO_4
- 4 Calibration stock solutions,
1000 $\mu\text{g/mL}$ Commercially available,
or prepared per instrument
manufacturer's recommendation (see
step 12)
- 5 Dilution acid, 4% HNO_3 , 1% HClO_4
Add 50 mL ashing acid to 600 mL
water, dilute to 1 L
- 6 Argon
- 7 Distilled, deionized water

*See Special Precautions

EQUIPMENT

- 1 Sampler cellulose ester membrane filter,
0.8- μm pore size, 37-mm diameter; in cassette
filter holder
- 2 Personal sampling pump, 1 to 4 L/min, with
flexible connecting tubing.
- 3 Inductively coupled plasma-atomic emission
spectrometer, equipped as specified by the
manufacturer for analysis of elements of interest
- 4 Regulator, two-stage, for argon
- 5 Beakers, Phillips, 125-mL, or Griffin, 50-mL, with
watchglass covers.*
- 6 Volumetric flasks, 10- and 100- mL.*
- 7 Assorted volumetric pipets as needed.*
- 8 Hotplate, surface temperature 150 $^{\circ}\text{C}$

*Clean all glassware with conc. nitric acid and
rinse thoroughly in distilled water before use.

SPECIAL PRECAUTIONS Perform all perchloric acid digestions in a perchloric acid hood

SAMPLING

- 1 Calibrate each personal sampling pump with a representative sampler in line
- 2 Sample at an accurately known flow rate between 1 and 4 L/min for a total sample size of
200 to 2000 L (see Table 1) for TWA measurements Do not exceed a filter loading of
approximately 2 mg total dust

SAMPLE PREPARATION

- 3 Open the cassette filter holders and transfer the samples and blanks to clean beakers
- 4 Add 5 mL ashing acid. Cover with a watchglass Let stand 30 min at room temperature
NOTE Start a reagent blank at this step
- 5 Heat on hotplate (120 $^{\circ}\text{C}$) until ca. 0.5 mL remains.
NOTE Some species of Li, Mn, Mo, Sn, W, and Zr will not be completely solubilized by this
procedure Alternative solubilization techniques for most of these elements can be
found elsewhere [2, 9, 15, 17]
- 6 Add 2 mL ashing acid and repeat step 5 Repeat this step until the solution is clear
- 7 Remove watchglass and rinse into the beaker with distilled water
- 8 Increase the temperature to 150 $^{\circ}\text{C}$ and take the sample to dryness
- 9 Dissolve the residue in 2 to 3 mL dilution acid
- 10 Transfer the solutions quantitatively to 10-mL volumetric flasks
- 11 Dilute to volume with dilution acid

CALIBRATION AND QUALITY CONTROL

- 12 Calibrate the spectrometer according to the manufacturers recommendations
NOTE Typically, an acid blank and 10 $\mu\text{g/mL}$ multielement working standards are used The
following multielement combinations are chemically compatible in 4% HNO_3 /1% HClO_4
 - a Ag, Ca, Co, Mn, Pb, V, Zn,
 - b Al, Be, Cd, La, Li, Ni, Ti,
 - c As, B, Ba, Mg, Mo, P, Sn,

- d Cu, Fe, Na, Pt, Sr, Te, Y,
- e Cr, K, Sb, Se, Ti, Zr and
- f Si, W (distilled water only)

- 13 Analyze a standard for every ten samples
- 14 Check recoveries with at least two spiked media blanks per ten samples

MEASUREMENT

- 15 Set spectrometer to conditions specified by manufacturer
 - 16 Analyze standards and samples
- NOTE If the values for the samples are above the range of the standards dilute the solutions with dilution acid, reanalyze and apply the appropriate dilution factor in the calculations

CALCULATIONS

- 17 Obtain the solution concentrations for the sample C_s ($\mu\text{g/mL}$) and the average media blank, C_b ($\mu\text{g/mL}$), from the instrument
- 18 Using the solution volumes of sample, V_s (mL), and media blank, V_b (mL), calculate the concentration, C (mg/m^3), of each element in the air volume sampled, V (L)

$$C = \frac{C_s V_s - C_b V_b}{V} \text{ mg/m}^3$$

EVALUATION OF METHOD

Method P&CAM 351 was evaluated in 1981 [1,2] The precision and recovery data were determined at 2.5 and 1000 μg of each element per sample on spiked filters The precision and recovery data, instrumental detection limits sensitivity and analytical wavelengths are listed in Table 2 The values in Table 2 were determined with a Jarrell-Ash Model 1160 ICP operated according to manufacturer's instructions

REFERENCES

- [1] Hull, R D "Multielement Analysis of Industrial Hygiene Samples " NIOSH Internal Report presented at the American Industrial Hygiene Conference, Portland, Oregon (May 1981)
- [2] NIOSH Manual of Analytical Methods, 2nd ed V 7 P&CAM 351 U S Department of Health and Human Services, Publ (NIOSH) 82-100 (1981)
- [3] Ibid, S341 (Lead)
- [4] Ibid, V 2, S5 (Manganese) U S Department of Health Education and Welfare Publ (NIOSH) 77-157-B (1977)
- [5] Ibid, V 4, P&CAM 271 (Tungsten), U S Department of Health Education and Welfare, Publ (NIOSH) 78-175 (1978)
- [6] Ibid, V 5, P&CAM 173 (Metals by Atomic Absorption) U S Department of Health Education and Welfare, Publ (NIOSH) 79-141 (1979)
- [7] Ibid, V 3, S183 (Tin), S185 (Zirconium), and S376 (Molybdenum) U S Department of Health Education, and Welfare, Publ (NIOSH) 77-157-C (1977)

METHOD REVISED BY R DeLon Hull and Mark Millson, NIOSH/DPSE

Table 1 Properties and sampling volumes

| Element (Symbol) | Properties | | Permissible Exposure Limits, mg/m ³ TWA OSHA/NIOSH/ACGIH | Air Volume @ OSHA, L | |
|---------------------|------------------|--------|---|----------------------|----------|
| | Atomic Weight | MP, °C | | MIN | MAX |
| Silver (Ag) | 107 87 | 961 | 0 01/ — / 0 1 | 250 | 2000 |
| Aluminum (Al) | 26 98 | 660 | — / — / 10 | 5 (g) | 100 (g) |
| Arsenic (As) | 74 92 | 817* | 0 5/C 0 002/ 0 2 | 5 | 2000 |
| Beryllium (Be) | 9 01 | 1278 | 0 002/ 0 0005/ 0.002 | 1250 | 2000 |
| Calcium (Ca) | 40 08 | 842 | 5 (b)/ — / 2 (b) | 5 | 200 |
| Cadmium (Cd) | 112 40 | 321 | 0 2/ 0 04/ 0 05 | 13 | 2000 |
| Cobalt (Co) | 58 93 | 1495 | 0 1/ — / 0 1 | 25 | 2000 |
| Chromium (Cr) | 52 00 | 1890 | 1 0 (c)/ 0 025/ 0 5 (c) | 5 | 1000 |
| Copper (Cu) | 63 54 | 1083 | 1 0/ — / 1 0 | 5 | 1000 |
| Iron (Fe) | 55 85 | 1535 | 10 (b)/ — / 5 (b) | 5 | 100 |
| Lithium (Li) | 6 94 | 179 | 0 025 (d)/ — / 0 025 (d) | 100 | 2000 |
| Magnesium (Mg) | 24 31 | 651 | 15 (b)/ — / 10 (b) | 5 | 67 |
| Manganese (Mn) | 54 94 | 1244 | C 5/ — / C 5 | 5 | 200 |
| Molybdenum (Mo) | 95 94 | 651 | 15 (e)/ — / 10 (e) | 5 | 67 |
| Sodium (Na) | 22 99 | 98 | 2 (f)/ C 2 (f)/ C 2 (f) | 13 | 2000 |
| Nickel (Ni) | 58 71 | 1453 | 1/ 0 015/ 1 (c) | 5 | 1000 |
| Phosphorus (P) | 30 97 | 44 | — / — / 0 1 | 25 (g) | 2000 (g) |
| Lead (Pb) | 207 19 | 328 | 0 05/ 0 1/ 0 15 | 50 | 2000 |
| Platinum (Pt) | 195 09 | 1769 | 0 002 (a)/ — / 1 (c) | 1250 | 2000 |
| Selenium (Se) | 78 96 | 217 | 0 2/ — / — | 13 | 2000 |
| Tin (Sn) | 118 69 | 232 | 2/ — / 2 (c) | 5 | 500 |
| Tellurium (Te) | 127 60 | 450 | 0 1/ — / 0 1 | 25 | 2000 |
| Titanium (Ti) | 47 90 | 1675 | — / — / 10 (b) | 5 | 100 |
| Thallium (Tl) | 204 37 | 304 | 0 1 (a)/ — / 0 1 (a) | 25 | 2000 |
| Vanadium (V) | 50 94 | 1890 | C 0 5/ 1 (c)/ 0.05 (V ₂ O ₅) | 5 | 2000 |
| Tungsten (W) | 183 85 | 3410 | — / 5 (e)/ 5 (e) | 5 (g) | 200 (g) |
| Yttrium (Y) | 88 91 | 1495 | 1/ — / 1 | 5 | 1000 |
| Zinc (Zn) | 65 37 | 419 | 5 (b)/ 5 (b)/ 5 (b) | 5 | 200 |
| Zirconium (Zr) | 91 22 | 1852 | 5/ — / 5 | 5 | 200 |

(a) soluble

(b) oxide

(c) metal

(d) hydride

(e) insoluble

(f) hydroxide

(g) at the ACGIH TLV

5 4 2 Excavation Hazards

Verticle walled excavations pose a hazard due to cave-ins slips trips falls and underground utilities Measures used to control these hazards include

- The preparation and approval of Soil Disturbance Permits which address overhead and underground utility hazards,
- The excavation will be inspected by a competent person prior to each shift, during each shift, and immediately after any rain or snow storms or other hazard increasing occurrences
- Heavy equipment entry into the excavation will not be permitted,
- The excavator will be operated in accordance with the manufacturers recommendations in regards to safe operating distances from the excavation
- At no time will the counterweight on the excavator be positioned above the open excavation,
- A spotter will be present during all excavation activities
- Personnel entry into the excavation will not be permitted,
- Personnel will stay a minimum of six feet away from the edge of the excavation,
- Personnel closer than six feet to the excavation must wear a full body harness and lifeline attached to an approved anchorage point and
- Equipment except the excavator will be kept a minimum of six feet away from the edge of the excavation

5 4 3 Noise Exposure Hazards

Work at the site will expose personnel to high noise levels from the operation of heavy equipment and hand tools Excessive noise exposure can cause both temporary and permanent effects on hearing The temporary effects of excessive noise include ringing in the ears, interference with communication and hearing threshold changes The effect of long-term excessive noise includes varying degrees of noise-induced hearing loss Measures used to control noise exposure hazards will include

- Noise monitoring to determine employee exposure
- Hearing protection for exposures of greater than 85 dBA for any length of time
- Noise monitoring to confirm the effectiveness of the hearing protection worn and
- Noise dosimetry to determine employee exposure and whether participation in the Hearing Conservation Program is required The Hearing Conservation Program includes both training and audiometric testing

Table 7.2
Miscellaneous Subtasks
Personal Protective Equipment Summary

| Task | Level | Body | Feet | Head | Eyes ¹ | Hand | Respirator |
|--|-------------------------|--|---|---------------------------|----------------------------------|---|--|
| Mixing ConCover® | C | Tyvek® | Steel toed safety shoes | Hard hat | None required | Inner surgeon gloves and heavy duty leather work gloves | Full facepiece air-purifying with HEPA cartridge |
| Pumping incidental waters or decontamination liquids into holding tanks or tanker trucks PPE is for personnel in the support zone PPE in the EZ/SCA will be that required for the task being performed | Modified D | Long sleeve cotton coveralls with neoprene apron | Steel toed safety shoes | Hard hat with face shield | Safety glasses with side shields | Outer nitrile gloves or inner surgeon gloves with heavy duty leather gloves | Based on breathing zone air monitoring |
| Frisking personnel or equipment at the stepoff pad located in the CRZ/RBA | Modified D | Long sleeve cotton coveralls | Steel toed safety shoes | Hard hat | Safety glasses with side shields | Inner surgeon gloves | None required |
| Conducting radiological or industrial hygiene air monitoring in the CRZ/RBA | Modified D | Long sleeve cotton coveralls | Steel toed safety shoes | Hard hat | Safety glasses with side shields | None required | None required |
| Refueling Heavy Equipment at the EZ/SCA Boundary | Modified D ² | Anti-C Tyvek® | Steel toed safety shoes and shoe covers | Hard hat | Safety glasses with side shields | Outer nitrile gloves or inner surgeon gloves with heavy duty leather gloves | None required |
| Refilling Heavy Equipment Airline Bottles at the EZ/SCA Boundary | Modified D ² | Anti-C Tyvek® | Steel toe safety shoes and shoe covers | Hard hat | Safety glasses with side shields | Outer nitrile gloves or inner surgeon gloves with heavy duty leather gloves | None required |
| General Heavy Equipment Maintenance at the EZ/SCA Boundary | Modified D ² | Anti-C Tyvek® | Steel toe safety shoes and shoe covers | Hard hat | Safety glasses with side shields | Outer nitrile gloves or inner surgeon gloves with heavy duty leather gloves | None required |
| Repair Waterline/Culvert and Erect Fence in the EZ/SCA | Modified D ³ | Anti-C Tyvek® | Steel toe safety shoes and shoe covers | Hard hat | Safety glasses with side shields | Outer nitrile gloves or inner surgeon gloves with heavy duty leather gloves | None required |

¹ No eye protection will be required when a full facepiece respirator is worn.

² Modified level D PPE will be allowed if all of the following conditions are met

- 1 Continuous real time air monitoring indicates no volatile organic compounds at levels above background
- 2 No excavating is taking place
- 3 Personnel stay as close to the equipment as possible No wandering
- 4 Radiological control technicians are present

³ Modified level D PPE will be allowed if all of the following conditions are met

- 1 Real time air monitoring indicates no volatile organic compounds at levels above background
- 2 Radiological control technicians are present as required on the RWP

LOGSHEET FOR FIELD CHANGES TO CONTROLLED DOCUMENTS

[illegible]